

## PATENT ABSTRACTS OF JAPAN

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(71)Applicant : MATSUSHITA ELECTRIC IND CO LTD

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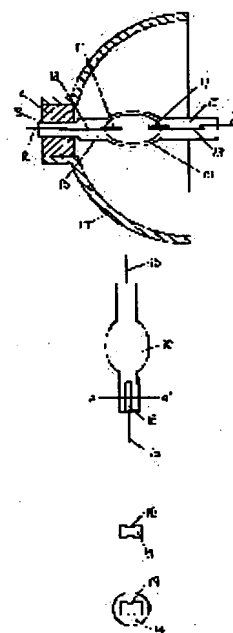
(72)Inventor : MONJU HIDETO  
 WAKAMIYA MASAYUKI  
 ITO YUKO  
 OMURA HIDEAKI  
 TAKEUCHI NOBUYOSHI

## (54) METALLIC VAPOR DISCHARGE LAMP

## (57)Abstract:

**PURPOSE:** To prevent the temperature rise of a seal section and a reflecting mirror and extend its life by providing a good heat conductor having a projection coupled with an arc tube between the arc tube and the reflecting mirror.

**CONSTITUTION:** A heat conductor 14 made of stainless steel is provided between a metallic vapor discharge arc tube 10 and a reflecting mirror 17, the projection 19 of the heat conductor 14 is coupled with the recess 8 of the metallic vapor discharge arc tube 10, and the metallic vapor discharge arc tube 10 and the heat conductor 14 are closely fixed together. The reflecting mirror 17, the metallic vapor discharge arc tube 10, and the heat conductor 14 are further fixed to form a metallic vapor discharge lamp. The reflecting mirror 17 is coated with a multi-layer interference film on its surface, infrared rays and ultraviolet rays radiated from the metallic vapor discharge arc tube 10 are cut, and only the visible light is reflected. The heat at the tip of an electrode seal section is effectively released to the heat conductor 14, the temperature at the tip of the electrode seal section and the reflecting mirror 17 is lowered, and the oxidation of a molybdenum external lead wire 16 and the crack of the reflecting mirror 17 are prevented.



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33/12		7316-2K		
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(71)出願人 000005821

松下電器産業株式会社  
大阪府門真市大字門真1006番地

(72)発明者 文字 秀人

大阪府門真市大字門真1006番地 松下電器  
産業株式会社内

(72)発明者 若宮 正行

大阪府門真市大字門真1006番地 松下電器  
産業株式会社内

(72)発明者 伊藤 由布子

大阪府門真市大字門真1006番地 松下電器  
産業株式会社内

(74)代理人 弁理士 小鍛治 明 (外2名)

最終頁に続く

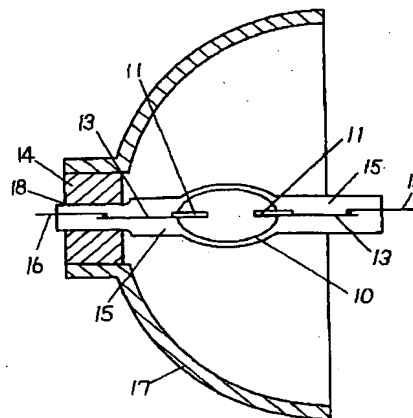
(54)【発明の名称】 金属蒸気放電灯

(57)【要約】

【目的】 金属蒸気放電灯において、発光管と嵌合する凸部を有した良熱伝導体を設けることにより、封止部と反射鏡の温度上昇を防止して、長寿命化する。

【構成】 反射鏡と金属蒸気放電発光管との間に発光管と嵌合する凸部を有した良熱伝導体を設けた金属蒸気放電灯。

- 10 金属蒸気放電発光管
- 11 タングステン電極
- 13 Mo箔
- 14 伝熱体
- 15 ビンチシール部
- 16 外部リード線
- 17 反射鏡
- 18 凹部



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## 【特許請求の範囲】

【請求項1】封止部に凹部を有した金属蒸気放電発光管と、多層干渉膜のコーティングした反射鏡との間に、金属蒸気放電発光管に密着固定しかつ前記凹部と嵌合する凸部を有した良熱伝導体からなる伝熱体を設けたことを特徴とする金属蒸気放電灯。

【請求項2】封止部に凹部を有した金属蒸気放電発光管と、多層干渉膜のコーティングした反射鏡との間に、金属蒸気放電発光管に密着固定しかつ前記凹部と嵌合する凸部と、少なくとも放熱用フィン及び通気孔のいずれか一つを設けた良熱伝導体からなる伝熱体を設けたことを特徴とする金属蒸気放電灯。

【請求項3】少なくとも、請求項1及び請求項2記載の金属蒸気放電灯と、ダイクロイックミラーと、液晶ライトバルブと、投写レンズと、コンデンサーレンズと、スクリーンとからなることを特徴とする投写型ディスプレイ。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】本発明は、高効率、高演色性、長寿命の金属蒸気放電灯、投写型ディスプレイに関する。

## 【0002】

【従来の技術】近年、CRT (CATHOD RAY TUBE、陰極線管) にかわる大画面のディスプレイとして、種々のものが提案されているが、大表示容量でカラー表示ができる大画面のディスプレイとして、各画素ごとに薄膜トランジスター (TFT) を形成したアクティブマトリクス方式の液晶パネルを投写型ディスプレイに応用する方式がとりわけ注目されている。

【0003】このようなディスプレイではとりわけ光源がキーデバイスであるが、発光効率、演色性等の点から金属ハロゲン化物を封入した金属蒸気放電灯が優れている。金属ハロゲン化物の充分な発光を得るためには、高い管壁温度が必要であり点灯時の発光管温度は1000℃近くに、また電極封止部先端においても400℃近くに達する。このため電極封止部においてモリブデンのリード線が酸化して断線したり、反射鏡が割れるなどの問題があり、金属蒸気放電灯の寿命が短かった。

【0004】このことを解決するために、送風手段によって発光管に送風して発光管温度を調節する方法 (例えば特開平4-32153号公報) が提案されている。

## 【0005】

【発明が解決しようとする課題】しかしながら、これらの冷却手段は、送風手段を新たに金属蒸気放電灯に設ける必要がある、またコストアップになるという問題があった。

## 【0006】

【課題を解決するための手段】この目的を達成するために本発明は、金属蒸気放電灯として、封止部に凹部を有した金属蒸気放電発光管と、多層干渉膜のコーティング

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した反射鏡との間に、金属蒸気放電発光管に密着固定しかつ前記凹部と嵌合する凸部を有した良熱伝導体からなる伝熱体を設けたことを特徴とするものである。

## 【0007】

【作用】点灯中の発光管は、電極封止部先端においても400℃近くに達するが、発光管と反射鏡とを良熱伝導体からなる伝熱体を介して密着固定することによって電極封止部先端の熱を伝熱体に逃がし、電極封止部先端及び反射鏡の温度を下げ、モリブデンのリード線の酸化や反射鏡の割れを防止することができる。伝熱体はこの凹部に嵌合しかつ電極封止部に密着するように加工し、伝熱体の材料000としては、熱伝導率が $3\text{ W} \cdot \text{m}^{-1} \cdot \text{K}^{-1}$ より大きいものが本発明の効果が大きく、例えばステンレス鋼、炭素鋼、真鍮、モリブデン、タングステン、銅、グラファイト、アルミナなどが好ましい。またこれらの伝熱体の熱膨張係数は電極封止部の石英ガラスのそれより大きいので、金属蒸気放電発光管の点灯時は伝熱体がより膨張して隙間ができるが、本願発明のように伝熱体に凸部、及び電極封止部に凹部を設けることによって高温時に金属蒸気放電発光管と伝熱体とがより密着して放熱が増すという効果がある。その結果電極封止部先端の熱を効果的に伝熱体に逃がし、電極封止部先端及び反射鏡の温度を下げ、モリブデンのリード線の酸化や反射鏡の割れを防止することができる。

【0008】したがって本発明により、長時間発光管を点灯させても明るい画面、高い表示品質を長時間維持した投写型ディスプレイが可能となる。

## 【0009】

## 【実施例】

(実施例1) 図1は本発明の金属蒸気放電灯の一実施例を示す断面図であり、10は金属蒸気放電発光管、11はタングステン電極、13はMo箔、14は金属蒸気放電発光管に固定密着した伝熱体、15は反射鏡を密閉するピンチシール部、16は外部リード線、17は多層干渉膜 (不図示) をコーティングした反射鏡、18は凹部である。

【0010】まず、本発明の実施例における金属蒸気放電発光管の製造方法を示す。石英ガラスからなるガラス管 (内径10mm、厚み2mm) の内部に不活性ガスをフローしながら、プロパン-酸素炎で約50秒火炎加工し、金型で所定の形状の管体にした。

【0011】このようにして得られたガラス管体にタングステン電極11とMo箔13からなる電極をはさんだ状態で、凹部18を形成できるように加工した金型でピンチシールを行なった。その中にヨウ化ネオジウム ( $\text{NdI}_3$ ) 3.0mg、ヨウ化デスプロシウム ( $\text{DyI}_3$ ) 6.0mg、ヨウ化セシウム ( $\text{CsI}$ ) 6.0mg、水銀 ( $\text{Hg}$ ) 40mgをアルゴンガスとともに封入し、チップシール部 (不図示) でチップシールして図1に示した金属蒸気放電発光管10を完成させた。このように作製し

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た金属蒸気放電発光管10の点灯試験を行なうと、ランプ電圧が95V、ランプ電流が2.6Aであった。

【0012】図2(a)は本発明の金属蒸気放電発光管の一実施例を示す模式図、(b)は金属蒸気放電発光管の断面AA'を示す断面図、(c)は金属蒸気放電発光管に嵌合する伝熱体14を示す模式図であり、19は伝熱体14の凸部である。ピンチシール部13では(b)のようにMo箔13と平行になるように凹部18を形成し、この凹部18に嵌合しかつピンチシール部に密着するようにステンレス鋼からなる伝熱体14を(c)に示した形状に加工した。

【0013】金属蒸気放電発光管10の凹部18と伝熱体14の凸部19とを嵌合させて金属蒸気放電発光管10と伝熱体14とを固定密着させた。反射鏡17と金属蒸気放電発光管10と伝熱体14とをさらに固定して、図1のような金属蒸気放電発光管10を反射鏡に組み込んだ金属蒸気放電灯を作製した。なお反射鏡17は、回転放物面の形状でガラス製の反射鏡の表面に多層干渉膜(不図示)をコーティングして、金属蒸気放電発光管10から放射される赤外線及び紫外線をカットし、可視光のみ反射させた。

【0014】金属蒸気放電発光管10は、アーク長7mmで垂直に点灯させた。試作した金属蒸気放電灯を点灯周波数250Hzの矩形波で点灯させると、いずれも全光束が約16000lm、色温度が約7300Kであった。また金属蒸気放電発光管10と伝熱体14との間に熱電対を挿入して、外部リード線16に近いピンチシール部15の温度を測定した結果、約350℃であった。そして本発明の金属蒸気放電灯を10000時間点灯した後においても、モリブデンの外部リード線16の酸化や反射鏡の割れは起こっていなかった。一方、比較例として同様の金属蒸気放電発光管10をセメントだけで反射鏡17に固着させた場合、外部リード線16に近いピンチシール部15の温度は約400℃あった。そして7000時間で反射鏡17に割れが発生し、8000時間でモリブデンの外部リード線16が酸化して断線した。

【0015】図3は本発明の実施例における投写型ディスプレイを示す模式図である。本発明の金属蒸気放電灯からなる光源21の光線22はコリメータレンズ23で集光され、ダイクロイックミラー24により青(B)、緑(G)、赤(R)の3色に分離してそれぞれの液晶ライトバルブ25に入射させた。3枚の液晶ライトバルブ25から得られたBGRの画像をそれぞれ3本の広角の投写レンズ26を用いてスクリーン27上で合成してフルカラーの映像を得た。本発明の金属蒸気放電灯を組み込んだ投写型ディスプレイの場合、スクリーン輝度はいずれも240f t-Lであり、また10000時間後においてもリード線の酸化や反射鏡の割れの無い、明るい画面、高い表示品質を長時間維持した投写型ディスプレイが可能となった。

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【0016】(実施例2)高珪酸ガラスからなるガラス管(内径10mm、厚み2mm)の内部に不活性ガスをフローしながら、水素-酸素炎で約20秒火炎加工し、金型で所定の形状の管体にした。

【0017】このようにして得られたガラス管体にタングステン製電極をはさんだ状態で封じた。その中にヨウ化ナトリウム(NaI)10mg、ヨウ化タリウム(TlI)1mg、ヨウ化インジウム(InI)0.6mg、水銀(Hg)50mgをアルゴンガスとともに封入し、チップシール部(不図示)でチップシールして図3に示した金属蒸気放電発光管10を完成させた。このように作製した金属蒸気放電発光管の点灯試験を行なうと、ランプ電圧が105V、ランプ電流が2.38Aであった。

【0018】図4(a)は本発明の金属蒸気放電発光管の一実施例を示す模式図、(b)は金属蒸気放電発光管の断面BB'を示す断面図、(c)は金属蒸気放電発光管の電極封着部に嵌合する伝熱体14を示す模式図であり、19は伝熱体14の凸部であり、電極封着部の凹部18に嵌合する。電極封着部の凹部はMo箔に直交するように(電極封着部の側面に相当する)ピンチシールして、凹部18を形成し、伝熱体14としては、アルミナを用いた。

【0019】金属蒸気放電発光管10の凹部18と伝熱体14の凸部19とを嵌合させて金属蒸気放電発光管10と伝熱体14とを固定密着させた。反射鏡17と伝熱体14とをネジで固定して、図3のような金属蒸気放電発光管10を反射鏡に組み込んだ金属蒸気放電灯を作製した。なお反射鏡17は、実施例1と同様のものを用いた。

【0020】なお金属蒸気放電発光管10は、アーク長7mmで垂直に点灯させた。試作した金属蒸気放電灯を点灯周波数250Hzの矩形波で点灯させると、いずれも全光束が23000lm、色温度が約5100Kであり、また金属蒸気放電発光管10と伝熱体14との間に熱電対を挿入して、外部リード線16に近いピンチシール部15の温度を測定した結果、約360℃であった。そして本発明の金属蒸気放電灯を10000時間点灯した後においても、モリブデンの外部リード線16の酸化や反射鏡の割れは起こっていなかった。一方比較例として同様の金属蒸気放電発光管10をセメントだけで反射鏡17に固着させた場合、外部リード線16に近いピンチシール部15の温度は約400℃あった。そして7500時間で反射鏡17に割れが発生し、8300時間でモリブデンの外部リード線16が酸化して断線した。

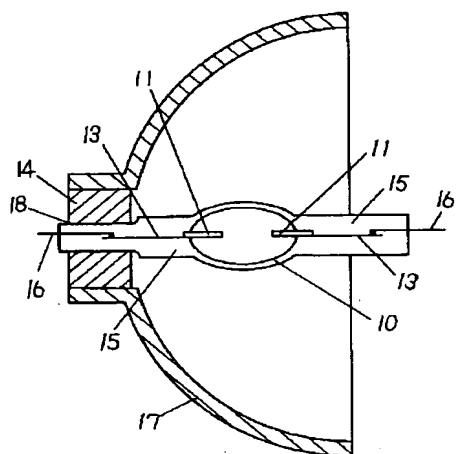
【0021】実施例1と同様に投写型ディスプレイに本発明の金属蒸気放電灯を組み込んだ。本発明の金属蒸気放電灯を組み込んだ投写型ディスプレイの場合、スクリーン輝度はいずれも230f t-Lであり、また10000時間後においてもリード線の酸化や反射鏡の割れの無い、明るい画面、高い表示品質を長時間維持した投写

27 スクリーン

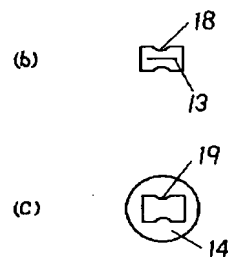
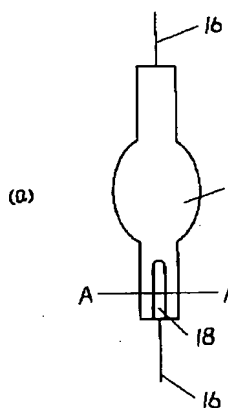
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【図1】

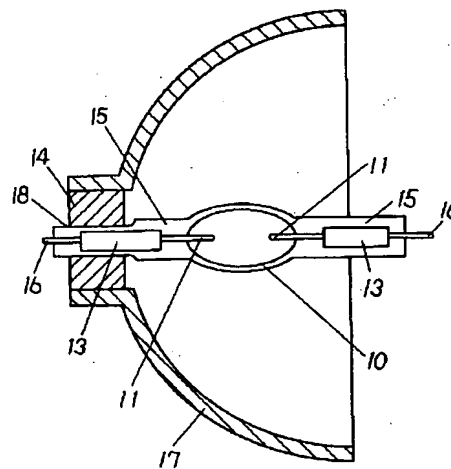
- 10 金属蒸気放電発光管
- 11 タングステン電極
- 13 Mo箔
- 14 伝熱体
- 15 ピンチシール部
- 16 外部リード線
- 17 反射鏡
- 18 凹部



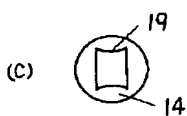
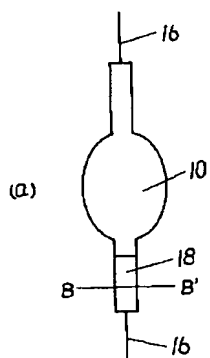
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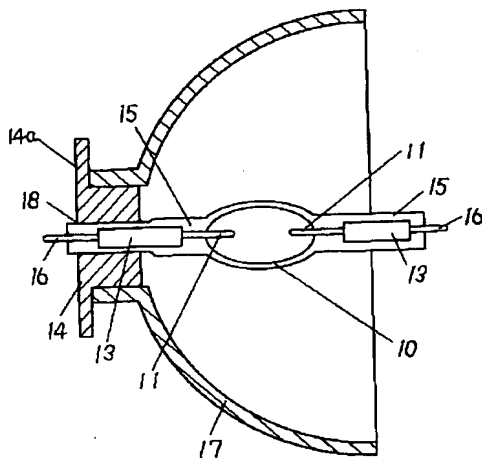
【図3】



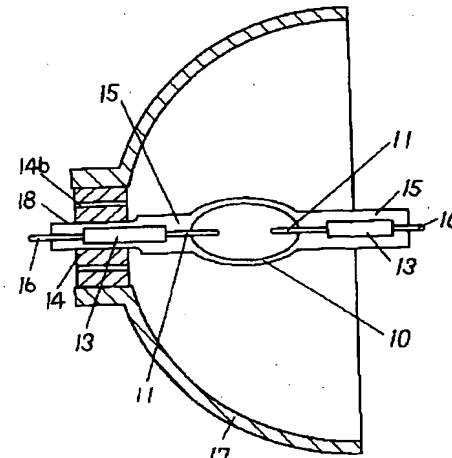
【図4】



【図5】



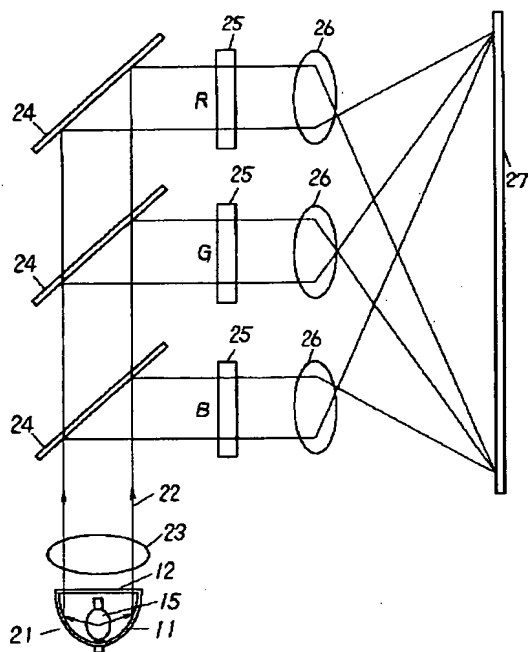
【図6】



(6)

【図7】

- 21 光源
- 24 ダイクロイックミラー
- 25 液晶ライトバルブ
- 27 スクリーン



フロントページの続き

(72)発明者 大村 秀明  
大阪府門真市大字門真1006番地 松下電器  
産業株式会社内

(72)発明者 竹内 延吉  
大阪府門真市大字門真1006番地 松下電器  
産業株式会社内



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(71)Applicant : MATSUSHITA ELECTRIC IND CO LTD

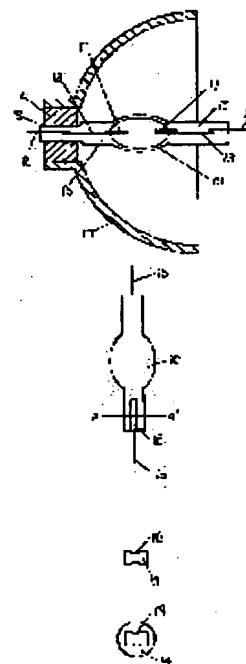
(72)Inventor : MONJU HIDETO  
 WAKAMIYA MASAYUKI  
 ITO YUKO  
 OMURA HIDEAKI  
 TAKEUCHI NOBUYOSHI

## (54) METALLIC VAPOR DISCHARGE LAMP

## (57)Abstract:

PURPOSE: To prevent the temperature rise of a seal section and a reflecting mirror and extend its life by providing a good heat conductor having a projection coupled with an arc tube between the arc tube and the reflecting mirror.

CONSTITUTION: A heat conductor 14 made of stainless steel is provided between a metallic vapor discharge arc tube 10 and a reflecting mirror 17, the projection 19 of the heat conductor 14 is coupled with the recess 8 of the metallic vapor discharge arc tube 10, and the metallic vapor discharge arc tube 10 and the heat conductor 14 are closely fixed together. The reflecting mirror 17, the metallic vapor discharge arc tube 10, and the heat conductor 14 are further fixed to form a metallic vapor discharge lamp. The reflecting mirror 17 is coated with a multi-layer interference film on its surface, infrared rays and ultraviolet rays radiated from the metallic vapor discharge arc tube 10 are cut, and only the visible light is reflected. The heat at the tip of an electrode seal section is effectively released to the heat conductor 14, the temperature at the tip of the electrode seal section and the reflecting mirror 17 is lowered, and the oxidation of a molybdenum external lead wire 16 and the crack of the reflecting mirror 17 are prevented.



## LEGAL STATUS

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**CLAIMS**

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[Claim(s)]

[Claim 1] The metallic-fumes electric-discharge lamp which carries out adhesion immobilization at metallic-fumes electroluminescence tubing between the reflecting mirrors with which metallic-fumes electroluminescence tubing with a crevice and the multilayer interference film coated the closure section, and is characterized by establishing the heat transfer object which consists of a right conductor with said crevice and the heights which fit in.

[Claim 2] The metallic-fumes electric-discharge lamp which carries out adhesion immobilization at metallic-fumes electroluminescence tubing between the reflecting mirrors with which metallic-fumes electroluminescence tubing with a crevice and the multilayer interference film coated the closure section, and is characterized by establishing said crevice, the heights which fit in, and the heat transfer object which consists of a right conductor which prepared any one of the fin for heat dissipation, and the air holes at least.

[Claim 3] The projection mold display characterized by consisting of claim 1 and a metallic-fumes electric-discharge lamp according to claim 2, a dichroic mirror, a liquid crystal light valve, a projection lens, a condenser lens, and a screen at least.

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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to efficient, high color rendering properties, a long lasting metallic-fumes electric-discharge lamp, and a projection mold display.

[0002]

[Description of the Prior Art] Although various things are proposed in recent years as a display of a big screen which changes to CRT (CATHOD RAY TUBE, cathode-ray tube), by large display capacity, the method which applies the liquid crystal panel of the active-matrix method which formed the thin film transistor (TFT) for every pixel to a projection display as a display of the big screen whose color display is possible divides, and attracts attention.

[0003] Although it divides and the light source is a key device, the metallic-fumes electric-discharge lamp which enclosed the metal halogenide from points, such as luminous efficiency and color rendering properties, is excellent in such a display. In order to obtain sufficient luminescence of a metal halogenide, a high condensed mercury temperature is required and the arc tube temperature at the time of lighting amounts to about 1000 degrees C also in an electrode closure section tip again at about 400 degrees C. For this reason, in the electrode closure section, the lead wire of molybdenum oxidized, and it disconnected, or there were problems, like a reflecting mirror can be broken, and the life of a metallic-fumes electric-discharge lamp was short.

[0004] In order to solve this, the method (for example, JP,4-32153,A) of ventilating an arc tube and adjusting arc tube temperature with a ventilation means, is proposed.

[0005]

[Problem(s) to be Solved by the Invention] However, these cooling means newly need to form a ventilation means in a metallic-fumes electric-discharge lamp, and had the problem of becoming a cost rise.

[0006]

[Means for Solving the Problem] In order to attain this purpose, this invention carries out adhesion immobilization at metallic-fumes electroluminescence tubing between the reflecting mirrors with which metallic-fumes electroluminescence tubing with a crevice and the multilayer interference film coated the closure section as a metallic-fumes electric-discharge lamp, and is characterized by establishing the heat transfer object which consists of a right conductor with said crevice and the heights which fit in.

[0007]

[Function] Although the arc tube under lighting amounts to about 400 degrees C also in an electrode closure section tip, by carrying out adhesion immobilization of an arc tube and the reflecting mirror through the heat transfer object which consists of a right conductor, it can miss the heat at the tip of the electrode closure section on a heat transfer object, can lower the temperature of an electrode closure section tip and a reflecting mirror, and can prevent oxidation of the lead wire of molybdenum, and the crack of a reflecting mirror. It is processed so that it may fit into this crevice and may stick to the electrode closure section, and as for the effectiveness of this invention, as an ingredient 000 of a heat transfer object, what has larger thermal conductivity than 3 W-m<sup>-1</sup>-K<sup>-1</sup> is large, for example, a heat transfer object has stainless steel, carbon steel, brass, molybdenum, a tungsten, copper, graphite, a desirable alumina, etc. Moreover, although a heat transfer object expands more and a clearance can do at the time of lighting of metallic-fumes electroluminescence tubing since the coefficient of thermal expansion of these heat transfer objects is larger than that of the quartz glass of the electrode closure section, it is effective in metallic-fumes electroluminescence tubing and a heat transfer object sticking more at the time of an elevated temperature, and heat dissipation increasing like the invention in this application, by establishing a crevice in heights and

the electrode closure section at a heat transfer object. As a result, the heat at the tip of the electrode closure section can be effectively missed on a heat transfer object, the temperature of an electrode closure section tip and a reflecting mirror can be lowered, and oxidation of the lead wire of molybdenum and the crack of a reflecting mirror can be prevented.

[0008] Therefore, by this invention, even if it makes a long duration arc tube turn on, the projection mold display which carried out long duration maintenance of a bright screen and the high display quality is attained.

[0009]

[Example]

(Example 1) Drawing 1 is the sectional view showing one example of the metallic-fumes electric-discharge lamp of this invention, and the reflecting mirror with which the heat transfer object with which in 10 a wolfram electrode and 13 were carried out at Mo foil, and metallic-fumes electroluminescence tubing and 11 carried out fixed adhesion of 14 at metallic-fumes electroluminescence tubing, the pinch seal section in which 15 seals a reflecting mirror, and 16 coated external lead wire, and 17 coated the multilayer interference film (un-illustrating), and 18 are crevices.

[0010] First, the manufacture approach of metallic-fumes electroluminescence tubing in the example of this invention is shown. Carrying out the flow of the inert gas to the interior of the glass tube (the bore of 10mm, thickness of 2mm) which consists of quartz glass, flame processing was carried out for about 50 seconds with propane oxygen flame, and it was made the shell of a predetermined configuration with metal mold.

[0011] Thus, the metal mold processed so that a crevice 18 could be formed where the electrode which becomes the acquired glass tube object from a wolfram electrode 11 and the Mo foil 13 is inserted performed the pinch seal. Iodation neodium (NdI3) 3.0mg, iodation dysprosium (DyI3) 6.0mg, 6.0mg (CsI) of cesium iodides, and (Mercury Hg) 40mg were enclosed with argon gas into it, and the metallic-fumes electroluminescence tubing 10 which carried out the chip seal in the chip seal section (un-illustrating) and which was shown in drawing 1 was completed. Thus, when the lighting trial of the produced metallic-fumes electroluminescence tubing 10 was performed, lamp voltage was 95V and the lamp current was 2.6A.

[0012] The mimetic diagram in which drawing 2 (a) shows one example of metallic-fumes electroluminescence tubing of this invention, the sectional view in which (b) shows section-A-A' of metallic-fumes electroluminescence tubing, and (c) are the mimetic diagrams showing the heat transfer object 14 which fits into metallic-fumes electroluminescence tubing, and 19 is the heights of the heat transfer object 14. In the pinch seal section 13, the configuration which showed in (c) the heat transfer object 14 which consists of stainless steel so that a crevice 18 may be formed so that it may become parallel to the Mo foil 13, as shown in (b), and it may fit into this crevice 18 and it may stick to the pinch seal section was processed.

[0013] Fitting of the crevice 18 of the metallic-fumes electroluminescence tubing 10 and the heights 19 of the heat transfer object 14 was carried out, and fixed adhesion of the metallic-fumes electroluminescence tubing 10 and the heat transfer object 14 was carried out. A reflecting mirror 17, the metallic-fumes electroluminescence tubing 10, and the heat transfer object 14 were fixed further, and the metallic-fumes electric-discharge lamp which built metallic-fumes electroluminescence tubing 10 like drawing 1 into the reflecting mirror was produced. In addition, the reflecting mirror 17 coated the front face of a reflecting mirror glass in the configuration of paraboloid of revolution with the multilayer interference film (un-illustrating), and omitted the infrared radiation and ultraviolet rays which are emitted from the metallic-fumes electroluminescence tubing 10, and only the light made it reflect them.

[0014] The metallic-fumes electroluminescence tubing 10 was made to turn on perpendicularly with the arc length of 7mm. When the metallic-fumes electric-discharge lamp made as an experiment was made to turn on by the square wave with a lighting frequency of 250Hz, total luminous flux was about 16000 lm(s), and the color temperature of all was about 7300K. Moreover, as a result of inserting a thermocouple between the metallic-fumes electroluminescence tubing 10 and the heat transfer object 14 and measuring the temperature of the pinch seal section 15 near the external lead wire 16, it was about 350 degrees C. And after turning on the metallic-fumes electric-discharge lamp of this invention for 10000 hours, neither oxidation of the external lead wire 16 of molybdenum nor the crack of a reflecting mirror had happened. On the other hand, when a reflecting mirror 17 was made to fix the metallic-fumes electroluminescence tubing 10 same as an example of a comparison only into cement, there were about 400 degrees C of temperature of the pinch seal section 15 near the external lead wire 16. And the crack occurred in the reflecting mirror 17 in 7000 hours, and the external lead wire 16 of molybdenum was oxidized and disconnected in 8000 hours.

[0015] Drawing 3 is the mimetic diagram showing the projection display in the example of this invention. It

was condensed by the collimator lens 23, the dichroic mirror 24 separated into three colors of blue (B), green (G), and red (R), and incidence of the beam of light 22 of the light source 21 which consists of a metallic-fumes electric-discharge lamp of this invention was carried out to each liquid crystal light valve 25. The image of BGR obtained from the liquid crystal light valve 25 of three sheets was compounded on the screen 27 using the projection lens 26 of three wide angles, respectively, and the full color image was acquired. In the case of the projection display incorporating the metallic-fumes electric-discharge lamp of this invention, the projection mold display of each screen brightness which is 240 ft-L and has neither oxidization of lead wire nor the crack of a reflecting mirror 10000 hours after and which carried out long duration maintenance of a bright screen and the high display quality was attained.

[0016] (Example 2) Carrying out the flow of the inert gas to the interior of the glass tube (the bore of 10mm, thickness of 2mm) which consists of high silica glass, flame processing was carried out for about 20 seconds with hydrogen-oxygen flame, and it was made the shell of a predetermined configuration with metal mold.

[0017] Thus, where the electrode made from a tungsten is inserted into the acquired glass tube object, it stopped. 10mg [ of sodium iodides ] (NaI) and iodation thallium (TII) 1mg, iodation indium (InI) 0.6mg, and (Mercury Hg) 50mg were enclosed with argon gas into it, and the metallic-fumes electroluminescence tubing 10 which carried out the chip seal in the chip seal section (un-illustrating) and which was shown in drawing 3 was completed. Thus, when the lighting trial of produced metallic-fumes electroluminescence tubing was performed, lamp voltage was 105V and the lamp current was 2.38A.

[0018] The mimetic diagram in which drawing 4 (a) shows one example of metallic-fumes electroluminescence tubing of this invention, the sectional view in which (b) shows cross-section BB' of metallic-fumes electroluminescence tubing, and (c) are the mimetic diagrams showing the heat transfer object 14 which fits into the electrode sealing section of metallic-fumes electroluminescence tubing, and 19 is the heights of the heat transfer object 14, and they fit into the crevice 18 of the electrode sealing section. The pinch seal of the crevice of the electrode sealing section was carried out so that it might intersect perpendicularly with Mo foil (it is equivalent to the side face of the electrode sealing section), and it formed the crevice 18, and used the alumina as a heat transfer object 14.

[0019] Fitting of the crevice 18 of the metallic-fumes electroluminescence tubing 10 and the heights 19 of the heat transfer object 14 was carried out, and fixed adhesion of the metallic-fumes electroluminescence tubing 10 and the heat transfer object 14 was carried out. The reflecting mirror 17 and the heat transfer object 14 were fixed with the screw, and the metallic-fumes electric-discharge lamp which built metallic-fumes electroluminescence tubing 10 like drawing 3 into the reflecting mirror was produced. In addition, the same thing as an example 1 was used for the reflecting mirror 17.

[0020] In addition, the metallic-fumes electroluminescence tubing 10 was made to turn on perpendicularly with the arc length of 7mm. When the metallic-fumes electric-discharge lamp made as an experiment was made to turn on by the square wave with a lighting frequency of 250Hz, as a result of total luminous flux's being 23000lm(s), and a color temperature's being about 5100K, and all inserting a thermocouple between the metallic-fumes electroluminescence tubing 10 and the heat transfer object 14 and measuring the temperature of the pinch seal section 15 near the external lead wire 16, it was about 360 degrees C. And after turning on the metallic-fumes electric-discharge lamp of this invention for 10000 hours, neither oxidation of the external lead wire 16 of molybdenum nor the crack of a reflecting mirror had happened. On the other hand, when a reflecting mirror 17 was made to fix the metallic-fumes electroluminescence tubing 10 same as an example of a comparison only into cement, there were about 400 degrees C of temperature of the pinch seal section 15 near the external lead wire 16. And the crack occurred in the reflecting mirror 17 in 7500 hours, and the external lead wire 16 of molybdenum was oxidized and disconnected in 8300 hours.

[0021] The metallic-fumes electric-discharge lamp of this invention was built into the projection display like the example 1. In the case of the projection display incorporating the metallic-fumes electric-discharge lamp of this invention, the projection mold display of each screen brightness which is 230 ft-L and has neither oxidization of lead wire nor the crack of a reflecting mirror 10000 hours after and which carried out long duration maintenance of a bright screen and the high display quality was attained.

[0022] (Example 3) The same metallic-fumes electroluminescence tubing 10 and same reflecting mirror 17 as an example 2 were used. Fin 14a for heat dissipation was prepared in the heat transfer object 14 which fits into the electrode sealing section of metallic-fumes electroluminescence tubing, and brass was used for it as the quality of the material.

[0023] Fitting of the crevice 18 of the metallic-fumes electroluminescence tubing 10 and the heights 19 of the heat transfer object 14 was carried out, and fixed adhesion of the metallic-fumes electroluminescence tubing 10 and the heat transfer object 14 was carried out. The reflecting mirror 17 and the heat transfer

object 14 were fixed into cement, and the metallic-fumes electric-discharge lamp which built metallic-fumes electroluminescence tubing 10 like drawing 5 into the reflecting mirror was produced. When the light was switched on on the same conditions as an example 2, as a result of inserting a thermocouple between the metallic-fumes electroluminescence tubing 10 and the heat transfer object 14 and measuring the temperature of the pinch seal section 15 near the external lead wire 16, it was about 330 degrees C. And after turning on the metallic-fumes electric-discharge lamp of this invention for 10000 hours, neither oxidation of the external lead wire 16 of molybdenum nor the crack of a reflecting mirror had happened.

[0024] The metallic-fumes electric-discharge lamp of this invention was built into the projection display like the example 1. In the case of the projection display incorporating the metallic-fumes electric-discharge lamp of this invention, the projection mold display of each screen brightness which is 230 ft-L and has neither oxidization of lead wire nor the crack of a reflecting mirror 10000 hours after and which carried out long duration maintenance of a bright screen and the high display quality was attained.

[0025] (Example 4) The same metallic-fumes electroluminescence tubing 10 and same reflecting mirror 17 as an example 2 were used. Air hole 14b was prepared in the heat transfer object 14 which fits into the electrode sealing section of metallic-fumes electroluminescence tubing, and nickel was used for it as the quality of the material.

[0026] Fitting of the crevice 18 of the metallic-fumes electroluminescence tubing 10 and the heights 19 of the heat transfer object 14 was carried out, and fixed adhesion of the metallic-fumes electroluminescence tubing 10 and the heat transfer object 14 was carried out. The reflecting mirror 17 and the heat transfer object 14 were fixed with the screw (un-illustrating), and the metallic-fumes electric-discharge lamp which built metallic-fumes electroluminescence tubing 10 like drawing 6 into the reflecting mirror was produced. When the light was switched on on the same conditions as an example 2, as a result of inserting a thermocouple between the metallic-fumes electroluminescence tubing 10 and the heat transfer object 14 and measuring the temperature of the pinch seal section 15 near the external lead wire 16, it was about 330 degrees C. And after turning on the metallic-fumes electric-discharge lamp of this invention for 10000 hours, neither oxidation of the external lead wire 16 of molybdenum nor the crack of a reflecting mirror had happened.

[0027] The metallic-fumes electric-discharge lamp of this invention was built into the projection display like the example 1. In the case of the projection display incorporating the metallic-fumes electric-discharge lamp of this invention, the projection mold display of each screen brightness which is 230 ft-L and has neither oxidization of lead wire nor the crack of a reflecting mirror 10000 hours after and which carried out long duration maintenance of a bright screen and the high display quality was attained.

[0028] In addition, in the metallic-fumes electric-discharge lamp of this invention, and a projection mold display, the configuration or enclosure object of metallic-fumes electroluminescence tubing, the amount of enclosure, the existence of a getter, the fixed approach to the reflecting mirror of metallic-fumes electroluminescence tubing and a heat transfer object, the location of coating of the multilayer interference film to a reflecting mirror, a configuration, a display principle of a projection display, etc. are not limited to this example.

[0029]

[Effect of the Invention] As explained above, the metallic-fumes electric-discharge lamp of this invention, and a projection mold display As a metallic-fumes electric-discharge lamp, in the closure section between metallic-fumes electroluminescence tubing with a crevice, and the reflecting mirror which the multilayer interference film coated By carrying out adhesion immobilization at metallic-fumes electroluminescence tubing, and establishing the heat transfer object which consists of a right conductor with said crevice and the heights which fit in The heat at the tip of the electrode closure section can be effectively missed on a heat transfer object, the temperature of an electrode closure section tip and a reflecting mirror can be lowered, and oxidation of the lead wire of molybdenum and the crack of a reflecting mirror can be prevented.

[0030] Therefore, by this invention, even if it makes a long duration arc tube turn on, the projection mold display which carried out long duration maintenance of a bright screen and the high display quality is attained.

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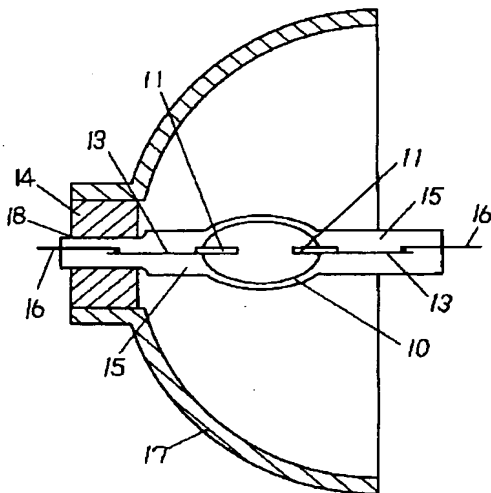
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DRAWINGS

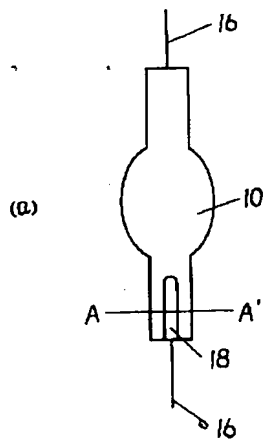
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[Drawing 1]

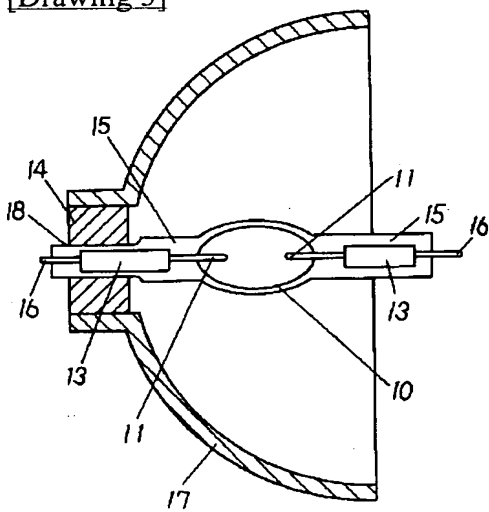
- 10 金属蒸気放電発光管
- 11 タングステン電極
- 13 Mo箔
- 14 伝熱体
- 15 ピンチシール部
- 16 外部リード線
- 17 反射鏡
- 18 凹部



[Drawing 2]

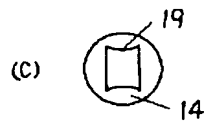
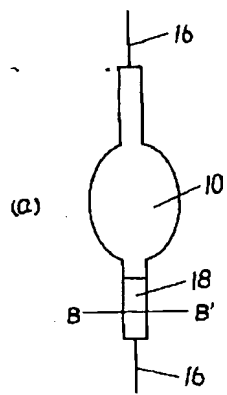


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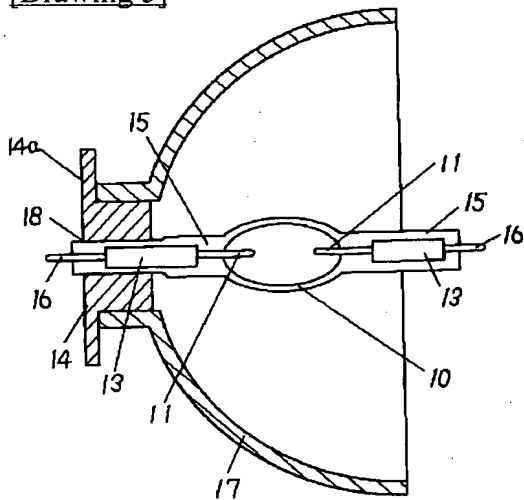


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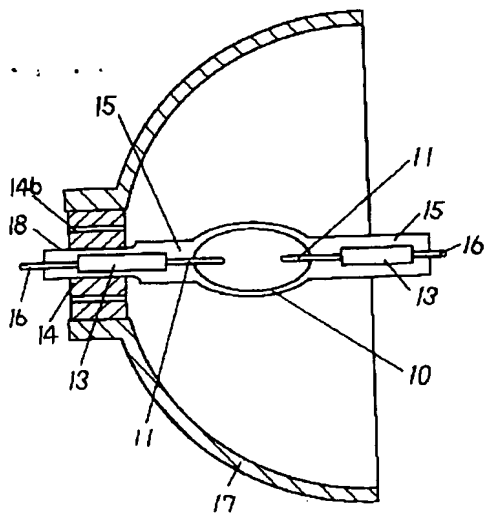




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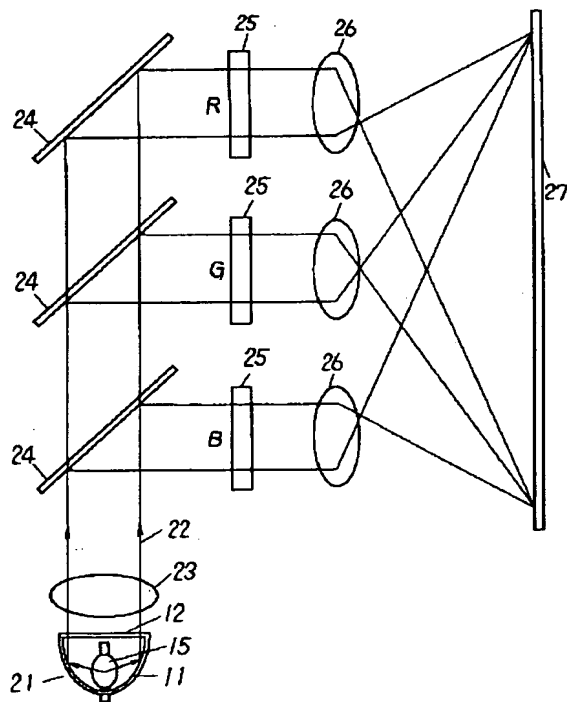


[Drawing 6]



[Drawing 7]

- 21 光源
- 24 ダイクロイックミラー
- 25 液晶ライトバルブ
- 27 スクリーン



[Translation done.]